

REMARKS

The application is believed to be in condition for allowance.

Claims 1-2, 4-5 and 7-10 are pending.

Claims 1-2, 4-5 and 7-10 are rejected under §112, first paragraph, as being said to contain subject matter not described in the specification in such a way as to reasonably convey to one of skill in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention.

The specification, as originally filed, is stated by the Official Action not to support the recitation of "wherein the first gas and the second gas do not intermix with the hollow structure."

Attention is directed to application Figures 1-4 and 6.

Shown is a plasma CVD apparatus comprising a substrate processing zone with a deposition substrate area disposed therein. See substrate 3 on back electrode 2.

A plasma generating zone for generating plasma of a first gas is shown by 22. A plasma confining electrode for separating the substrate processing zone and the plasma generating zone is shown by 20. This electrode is recited further as confining the first gas and having holes for passing the first gas containing neutral radicals from the first gas plasma such that the first gas is uniformly supplied to the

substrate processing zone. See the arrows 21 indicating that the first gas passes through the plasma confining electrode without entry into the plasma confining electrode internals. Figure 2 shows this clearly.

Claim 1 continues by reciting that the plasma confining electrode has a hollow structure, accommodates horizontal gas dispersing plates 23, 24 within the hollow structure. The hollow structure with dispersing plates for uniformizing a second gas in the plasma confining electrode. See Figure 2. The drawing figures also show that the lower plate 27 has holes for introducing the second gas into the substrate processing zone.

The claim concludes with the recitation that the first gas and the second gas do not intermix within the hollow structure. This is clear since the first gas passes through the hollow structure by way of passing holes 5 corresponding the flow arrows 21. See the detail shown by Figure 2. The first gas never enters the hollow structure and therefore cannot intermix with the second gas. The passing holes 5 isolate the first gas from the second gas when passing through the plasma confining electrode.

When discussing the plasma confining electrode of Figure 2, see that specification page 14, lines 4-11 explicitly states that the first gas 21 and the second gas 19 "are not mixed". See the concluding line of this paragraph that "[t]o

this end, the radical passing holes 5 are formed as continuous holes 5 by walls isolating them from the zone, in which the monosilane gas is present."

In view of the above, it is clear that claims 1-2, 4-5 and 7-10 contain subject matter described in the specification in such a way as to reasonably convey to one of skill in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention. Specifically, as originally filed, the specification and drawing figures support the recitation of "wherein the first gas and the second gas do not intermix with the hollow structure."

Reconsideration and withdrawal of this rejection are respectfully requested.

The Official Action rejected the pending claims under §103 as obvious over NEC Corp. (JP 11-168094) in view of KUTHI et al. 6,106,663 or TATSUO et al. (JP 03-197684).

As the Official Action appears to have misunderstood the actual **recited** structure of the present invention, the obviousness rejections appear to be flawed. When considering the structure, as recited, of the present invention, applicant believes that there is no motivation to combine the applied references in any way that would result in the recited structure.

The Official Action is correct that the test is what the teachings of the references would have suggested to those of

ordinary skill in the art. However, the test also includes how one of ordinary skill in the art would apply those teachings to the structure being modified, i.e., how would the teachings of the art motivate the modification of the NEC reference.

As stated by MPEP §706.02(j), to establish a *prima facie* case of obviousness, the Official Action must first, consider the relevant teachings of the prior art, and after determining the differences between the pending claim and the prior art teachings, second, propose modifications of the prior art necessary to arrive at the claimed subject matter, **explaining the motivation for combining the particular references and making the proposed modifications to those references**. Thus, there must be motivation to modify the references and a teaching or suggestion of all the claim recitations.

However, the prior art references must either expressly or impliedly suggest the claimed invention or the Official Action must convincingly reason why one skill in the art would have found the claimed invention obvious in light of the teachings of the references. *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

See also *Ex parte Nesbit*, 25 USPQ2d 1817, 1820 (Bd. Pat. App. & Int'f 1992); *Ex parte Marinaccio*, 10 USPQ2d 1716 (Bd. Pat. App. & Int'f 1989); *Ex parte Dussaud*, 7 USPQ2d 1818, 1820 (Bd. Pat. App. & Int'f 1988) ("The mere fact that the prior art

could be modified in the manner proposed by the examiner would not have made the modification obvious unless the prior art suggested the desirability of the modification."); *Ex parte Skinner*, 2 USPQ2d 1788, 1790 (Bd. App. & Int'f 1986) ("When the incentive to combine the teachings of the references is not readily apparent, it is the duty of the examiner to explain why the combination of the reference teachings is proper."); *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Int'f 1985) ("To support the conclusion that the claimed combination is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed combination or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references. ... [S]implicity and hindsight are not proper criteria for resolving the issue of obviousness.").

Relevant to this point, the Federal Circuit emphasized that "[m]ost, if not all, inventions are combinations and mostly of old elements." *In re Rouffett*, 47 USPQ 2d 1453, 1457 citing to *Richdel, Inc. v. Sunspool Corp.*, 219 USPQ 8, 12 (Fed. Cir. 1983). The Federal Circuit continued by noting that "rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a

blue print for piecing together elements in the prior art to defeat the patentability of the claimed invention."

Thus, the Federal Circuit requires that in order to prevent the use of such hindsight, the Official Action must "show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed." (*In re Rouffett* at 1458).

The Official Action refers to Figure 5 of the NEC Corp. reference. As acknowledged by the Official Action, the NEC reference does not disclose either that the recited plasma confining electrode accommodates horizontal gas dispersion plates within the hollow structure (as per claim 1) or that the gas introducing member accommodates horizontal gas dispersion plates within the hollow structure (as per claim 4).

The Official Action offers both KUTHI et al. and TATSUO et al. as disclosing horizontal gas dispersion plates within a hollow gas introducing member. Note that neither of these hollow gas introducing members are the same as the recited plasma confining electrode. So, the rejection is not based on substituting a known hollow gas introducing member into the NEC reference to serve as a plasma confining electrode.

The Official Action urges that KUTHI et al. and TATSUO et al. teach that using horizontal gas dispersion plates within a hollow gas introducing member advantageously allows a second gas into the substrate processing zone to allow for more uniform flow of gas to the processing region.

As to KUTHI et al., Figure 1B shows horizontal gas dispersion plates 122 within a hollow gas introducing member electrode 114 (column 1, lines 53-67). These features of KUTHI et al. are offered as teaching modifications that would allow for more uniform flow of gas to the processing region.

This dispersion arrangement is to a single gas being distributed within an enclosed volume. KUTHI et al. make no teaching as to coordinating the single gas dispersion with a second gas dispersion.

Thus, this reference does not provide insight into uniformly dispersing two gases into a single substrate-processing zone, e.g., where the first gas passes through a confining electrode/member and the second gas uniformizes within the hollow structure of the confining electrode/member, the first and second gases not intermixing in the hollow of the plasma confining electrode.

The Official Action appears not to have considered the claim 1 recitation of "the plasma confining electrode has a hollow structure, accommodates horizontal gas dispersing plates

within the hollow structure for uniformalizing a second gas in the plasma confining electrode, and has holes for introducing the second gas into the substrate processing zone..." and the claim 4 recitation that "the gas introducing member has a hollow structure, accommodates dispersing plates within the hollow structure for uniformalizing the second gas in the gas introducing member ..."

The claims are explicit, i.e., the claims recite wherein the first gas and the second gas do not intermix within the hollow structure.

The obviousness rejection needs to be considered with respect to the whole inventive structure. That is, the recitations concerning the first gas passing through the hollow structure electrode and the second gas being uniformalized within the hollow electrode, the two gases not mixing within the hollow structure.

KUTHI et al. make no teaching concerning the issues of dealing with two gases. The NEC reference has already dealt with two gases, but not in the manner recited by the present claims.

Also note that KUTHI et al. teach the gas being supplied by a single inlet located at the horizontal top of the hollow gas introducing member 114.

From this reference, there is no teaching of the recitations of the new dependent claims 7-10.

TATSUO et al. show an alternative approach to the two-gas issue. See that TATSUO et al. Figure 2 shows two gases being utilized and mixed within the upper portion of device 20. That is, see reaction chamber 2, i) device 20 introducing the first gas (via holes 25a) and ii) device 40 for introducing a second gas via holes 42.

Thus, there is a mixing in the entry portion of the device 20, where both gases are introduced along a long horizontal edge of the entry portion. See that the second gas, activated by the plasma, is introduced into the upper (entry) portion of device 20 where the two gases are intermixed and, after intermixing, are ejected through holes 22 towards substrate 9. See the Abstract: the second gas ... mixed with the first gas, the mixture is injected ... from the distribution plate 21 [via holes 22]."

The arrangement of TATSUO et al. also shows the gases being intermixed in a plasma generating zone. See electrodes 23. Thus, there is a teaching of having mixed gases in the plasma generating zone. Such an arrangement causes both gases to be decomposed into plasma which may cause abnormal discharge of plasma or decomposition of the neutral gas by the energy within the plasma space. Such an arrangement is inconsistent with the NEC reference.

Thus, if the teachings of TATSUO et al. are applied to the NEC reference, there would be a mixing within a device and with a plasma generation zone as in device 20, rather than the recited solution of the present invention.

Also, note the teaching as to the entry of the second gas is not that recited by new claims 8-10.

Claims 7-8 recite the advantageous configuration of the plasma confining electrode (the gas introducing member) have a neutral gas supply line connection at one of the vertical end surfaces so as to allow the neutral gas to be provided via that side end of the hollow structure of the plasma confining electrode (the gas introducing member). The references do not provide teachings which would motivate one of skill to modify the NEC structure to include these features.

Claims 9-10 recite the further advantageous configuration of the plasma confining electrode (the gas introducing member) having neutral gas supply line connections at each of the vertical end surfaces so as to allow the neutral gas to be provided via both side ends of the hollow structure of the plasma confining electrode (the gas introducing member). See at least Figure 1 for support of these recitations. Again, the references do not provide teachings which would motivate one of skill to modify the NEC structure to include these features.

In summary, the disclosure of KUTHI et al. has no teachings as to a system operating with two gases and only concerns a much simpler, single-gas application and provides no insight into use in a two-gas system.

The teachings of TATSUO et al. teach away from the present solution (and recitations of the present claims).


Only the present invention teaches the recited apparatus and, without the teachings of the present application, it is believed that there is motivation to modify the NEC apparatus to that recited by the presently-pending claims. Accordingly, the obviousness rejection is not believed to be viable.

Reconsideration and allowance of all the pending claims are therefore respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

YOUNG & THOMPSON



Roland E. Long, Jr., Reg. No. 41,949
745 South 23rd Street
Arlington, VA 22202
Telephone (703) 521-2297
Telefax (703) 685-0573
(703) 979-4709

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